



Polypropylene RA7050

Polypropylene Random Copolymer for Pressure Pipe Systems

Description

PP-RCT (PolyPropylene-Random Crystallinity Temperature) is a material classification defined in ISO 1043-1:2001 to describe the second-generation class of PP-R materials. This pipe class, PP-RCT, has recently been included in EN ISO 15874, the global standard for plastics piping systems for Hot and Cold Water pipe installations and enable increased performance and competitiveness for pipe producers.

RA7050 is a PP-RCT polypropylene-random-copolymer with a special crystallinity brought about by a special beta-nucleation which exhibits an improved pressure resistance, especially at elevated temperatures. PP-RCT materials such as RA7050 are designed to fulfil the PP-RCT pipe class as described in the EN ISO 15874 standard, e.g. 50 years service life at 70°C at 5 MPa, compared to 3.2 MPa for standard PP-R materials when tested according to the ISO 9080 pipe pressure tests.

RA7050 is ready compounded for maximum quality control. The colour of RA7050 is steel grey similar to RAL 7042.

Applications

In general RA7050 is intended to be used in applications for plumbing and heating, such as in-house hot and cold water pipes and fittings, floor and wall heating systems and radiator connections.

Physical Properties **

		Typical Value*	Unit	Test Method
Density		905	kg/m ³	ISO 1183
Melt Flow Rate	(230°C/2.16 kg)	0.25	g/10 min	ISO 1133
Tensile Stress at Yield	(50 mm/min)	25	MPa	ISO 527-2
Tensile Strain at Yield	(50 mm/min)	10	%	ISO 527-2
Modulus of Elasticity in Tension	(1 mm/min)	900	MPa	ISO527
Charpy Impact Strength, notched	(+23°C)	40	kJ/m ²	ISO 179/1eA
Charpy Impact Strength, notched	(0°C)	4	kJ/m ²	ISO 179/1eA
Charpy Impact Strength, notched	(-20°C)	2	kJ/m ²	ISO 179/1eA
Mean Linear Thermal Coefficient of Expansion from 0°C to 70°C		1.5	*10 ⁻⁴ K ⁻¹	DIN 53752
Thermal Conductivity		0.24	WK ⁻¹ m ⁻¹	DIN 52612 Part 1

* Data should not be used for specification work.

** Measured on standard moulded specimens.

Processing guidelines

Pipe Extrusion

Pipes made of RA7050 are produced on single screw extruders of 30D or more in length. They are preferably equipped with a grooved and intensely cooled feed zone. Conventional die heads, like spider mandrel, spiral melt distributor or screen cage dies, can be used as forming tools. The use of a screen pack (sieve 60 to 100 mesh) is recommended to ensure quality during production.

In general, vacuum tank calibration is used with a sizing sleeve or disc calibrator. A sizing sleeve with integrated water ring is recommended to prevent the melt from sticking in the sizing sleeve. Alternatively, a separate spray ring can be connected prior to the vacuum tank.

Polypropylene RA7050

The cold temperature impact performance of RA7050 pipes depends on the processing. Diagram 1 illustrates the influence of different processing conditions on the impact behaviour at 0°C.

In order to avoid the manufacture of pipes that show a brittle behaviour at the freezing temperature the following recommendations shall be followed. It is essential that the melt temperature of the material leaving the die head lies between 220–230°C. This is achieved by setting the extruder cylinder temperatures in the range of 215–230°C and the tool temperatures in the range of 220–230°C. The specified melt temperature range provides a homogeneously and thoroughly molten polymer; a prerequisite to achieve an optimum crystal structure. Furthermore, the defined melt temperature level results in a favourable heat transfer rate for the development of the right form and degree of crystallinity.

In addition to the appropriate extruder settings the impact performance can further be enhanced by an arrangement of cooling tanks that allow for an in-line annealing or by a post-extrusion annealing process. These measures to optimise the impact performance are optional.

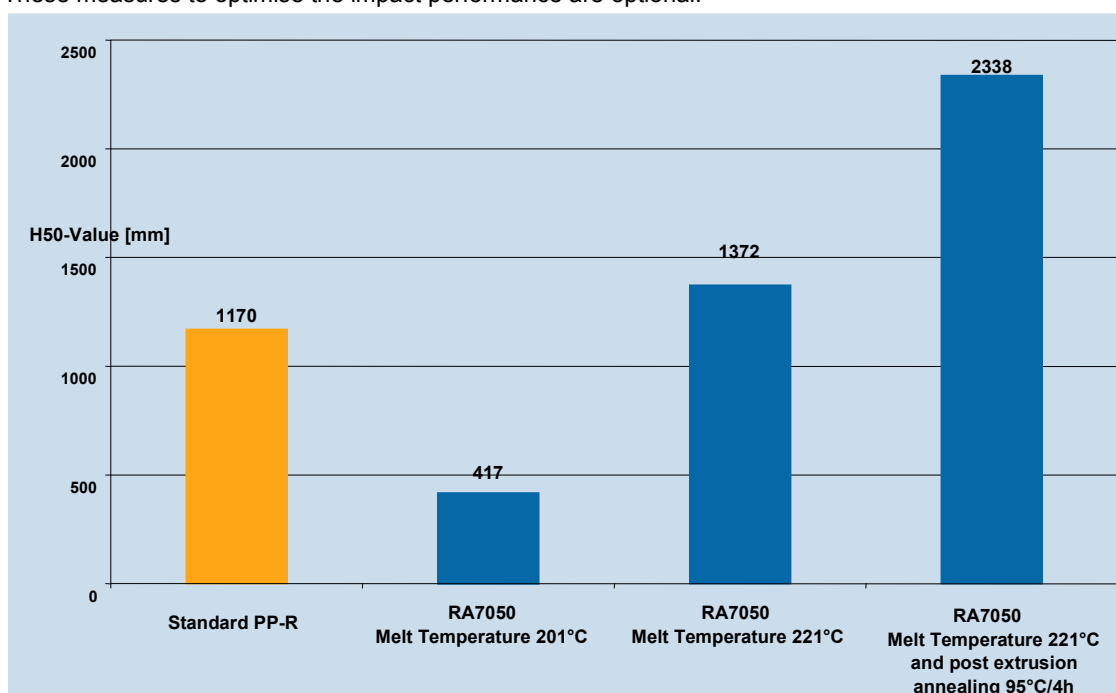


Diagram 1: Impact performance of pipes 25 x 3,5 mm measured at 0°C according to the EN 1411

Injection Moulding of Fittings

RA7050 can be processed on every modern injection moulding equipment with screw plasticators. Machine parameters and processing conditions used for standard PP-R can be applied to RA7050. The temperature settings shall be selected such that the polymer temperature increases uniformly; ideally from 200°C at the feed hopper to 220–250°C at the injection nozzle. At no time should the mass temperature exceed 250°C as degradation of the material will start to take place.

As the melt temperature during injection moulding of fittings is usually above 220°C the right form and degree of crystallinity is attained thereby a good low temperature impact behaviour level is achieved.



Polypropylene RA7050

To obtain a stable and homogeneous melt it is best to choose a dosing volume between 1D and 3D. Outside these limits irregular filling of the mould, air inclusions or surface streaks may arise.

Storage and handling

RA7050 should be stored in dry conditions at temperatures below 50°C and protected from UV-light. Improper storage can initiate degradation, which results in odour generation and colour changes and can have negative effects on the physical properties of the product.

Safety

RA7050 is not classified as dangerous preparation.

Dust and fines from the product carry a risk of dust explosion. All equipment should be properly earthed. Inhalation of dust should be avoided as it may cause irritation of the respiratory system. Small amounts of fumes are generated during processing of the product. Proper ventilation is therefore required.

Recycling

The product is suitable for recycling using modern methods of shredding and cleaning. In-house production waste should be kept clean to facilitate direct recycling.

A Safety Data Sheet is available on request. Please contact your Borealis representative for more details on various aspects of safety, recovery and disposal of the product.

Related documents

The following related documents are available on request, and represent various aspects on the usability, safety, recovery and disposal of the product.

Recovery and disposal of Polyolefins
Information on Emissions from Processing and Fires
Safety Data Sheet, SDS
Environmental Fact Sheet

Liability Statements on:

- Compliance to regulations for drinking water pipes
- Statements on chemicals and certain regulations and norms



Legal disclaimer

The product(s) mentioned herein are not intended to be used for medical, pharmaceutical or healthcare applications and we do not support their use for such applications.

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication, however we do not assume any liability whatsoever for the accuracy and completeness of such information.

Borealis makes no warranties which extend beyond the description contained herein. Nothing herein shall constitute any warranty of merchantability or fitness for a particular purpose.

It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.

No liability can be accepted in respect of the use of any Borealis product in conjunction with any other products and/or materials. The information contained herein relates exclusively to our products when not used in conjunction with any other material unless as specifically provided for in the test methods stated above.